The New version of Danish food composition database FRIDA including a case study on recipe calculation compared to a chemical analysis

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New version of the Danish food composition databank FRIDA

Including a case study on recipe calculation compared to chemical analysis.

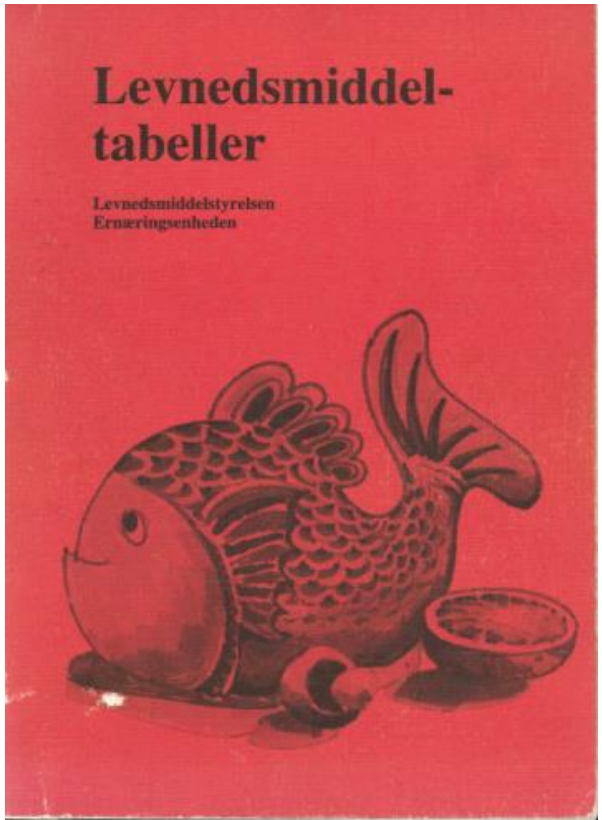
Tue Christensen and Anja Biltoft-Jensen

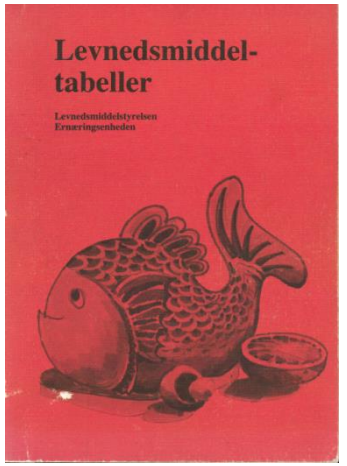
The beginning

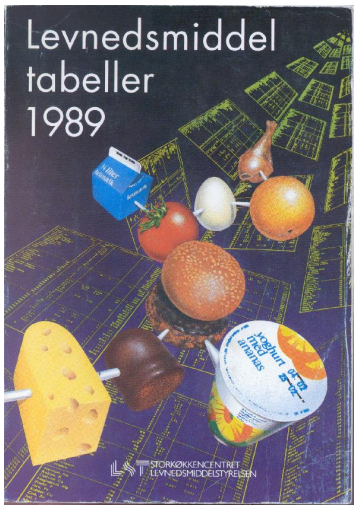
- Denmark is in need of official tables, as National Dietary Survey is being planned.
- In 1981 The Danish Meat Trade College in Roskilde and the National Food Institute initiates project on food data bank.
- 1983 the first printed version is published

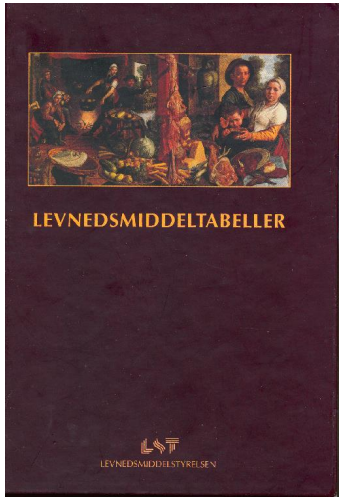
The sequels

- Printed tables are published in the 80’ and 90’
- 1985 version 2
- 1989 version 3
- 1996 version 4



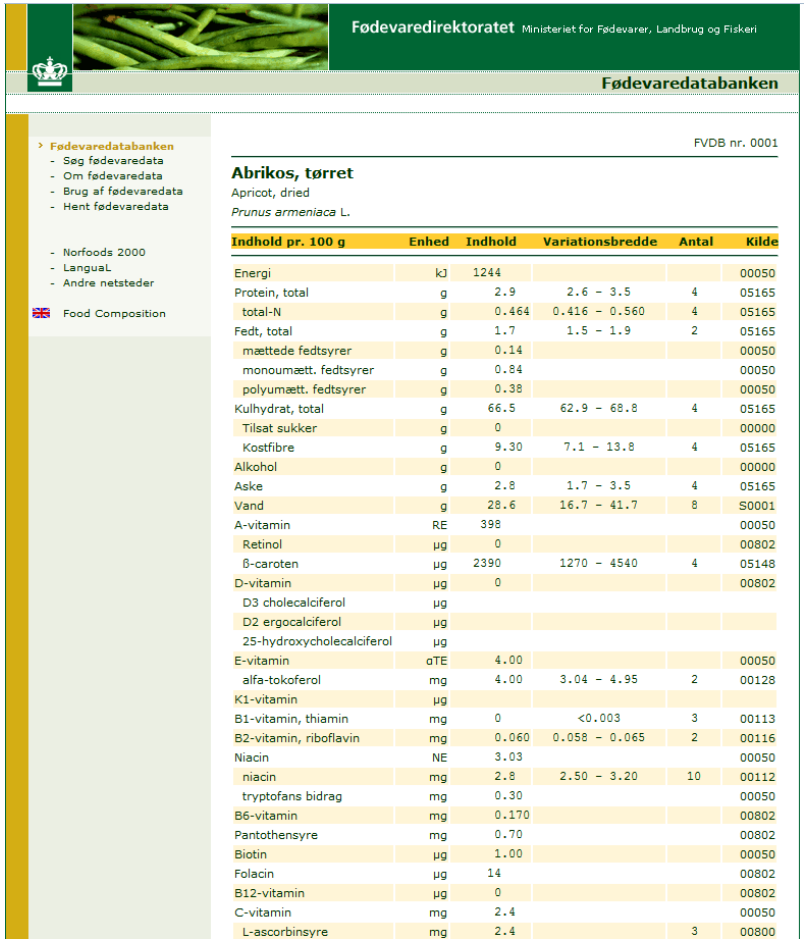






WWW.foodcomp.dk

- 2002 our first release on the internet



Fødevaredirektoratet Ministeriet for Fødevarer, Landbrug og Fiskeri

Fødevaredatabanken

- Fødevaredatabanken
  - Søg fødevaredata
  - Om fødevaredata
  - Brug af fødevaredata
  - Hent fødevaredata
- Norfoods 2000
- LangualL
- Andre netsteder
- Food Composition

FVDB nr. 0001

Abrikos, tørret

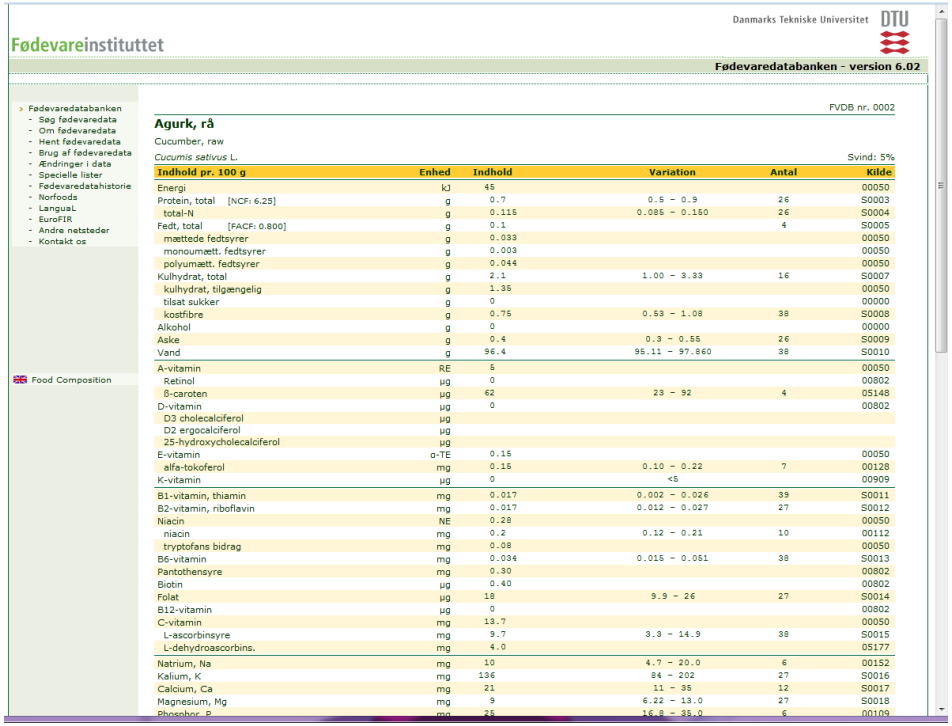
Apricot, dried

Prunus armeniaca L.

Indhold pr. 100 g	Enhed	Indhold	Variationsbredde	Antal	Kilde
Energi	kJ	1244			00050
Protein, total	g	2.9	2.6 - 3.5	4	05165
total-N	g	0.464	0.416 - 0.560	4	05165
Fedt, total	g	1.7	1.5 - 1.9	2	05165
mættede fedtsyrer	g	0.14			00050
monoumætt. fedtsyrer	g	0.84			00050
polyumætt. fedtsyrer	g	0.38			00050
Kulhydrat, total	g	66.5	62.9 - 68.8	4	05165
Tilsat sukker	g	0			00000
Kostfibre	g	9.30	7.1 - 13.8	4	05165
Alkohol	g	0			00000
Aske	g	2.8	1.7 - 3.5	4	05165
Vand	g	28.6	16.7 - 41.7	8	S0001
A-vitamin	RE	398			00050
Retinol	µg	0			00802
ß-caroten	µg	2390	1270 - 4540	4	05148
D-vitamin	µg	0			00802
D3 cholecalciferol	µg				
D2 ergocalciferol	µg				
25-hydroxycholecalciferol	µg				
E-vitamin	αTE	4.00			00050
alfa-tokoferol	mg	4.00	3.04 - 4.95	2	00128
K1-vitamin	µg				
B1-vitamin, thiamin	mg	0	<0.003	3	00113
B2-vitamin, riboflavin	mg	0.060	0.058 - 0.065	2	00116
Niacin	NE	3.03			00050
niacin	mg	2.8	2.50 - 3.20	10	00112
tryptofans bidrag	mg	0.30			00050
B6-vitamin	mg	0.170			00802
Pantothensyre	mg	0.70			00802
Biotin	µg	1.00			00050
Folacin	µg	14			00802
B12-vitamin	µg	0			00802
C-vitamin	mg	2.4			00050
L-ascorbinsyre	mg	2.4		3	00800

www.foodcomp.dk

- 2005 our second release on the internet



Fødevareinstituttet

Danmarks Tekniske Universitet DTU

Fødevaredatabanken - version 6.02

- Fødevaredatabanken
- Søg fødevaredata
- Om fødevaredata
- Hent fødevaredata
- Brug af fødevaredata
- Ændringer i data
- Specielle lister
- Fødevaredatahistorie
- Norfoods
- LanguaL
- EuroFIR
- Andre netsteder
- Kontakt os

Food Composition

FVDB nr. 0002

Agurk, rå

Cucumber, raw

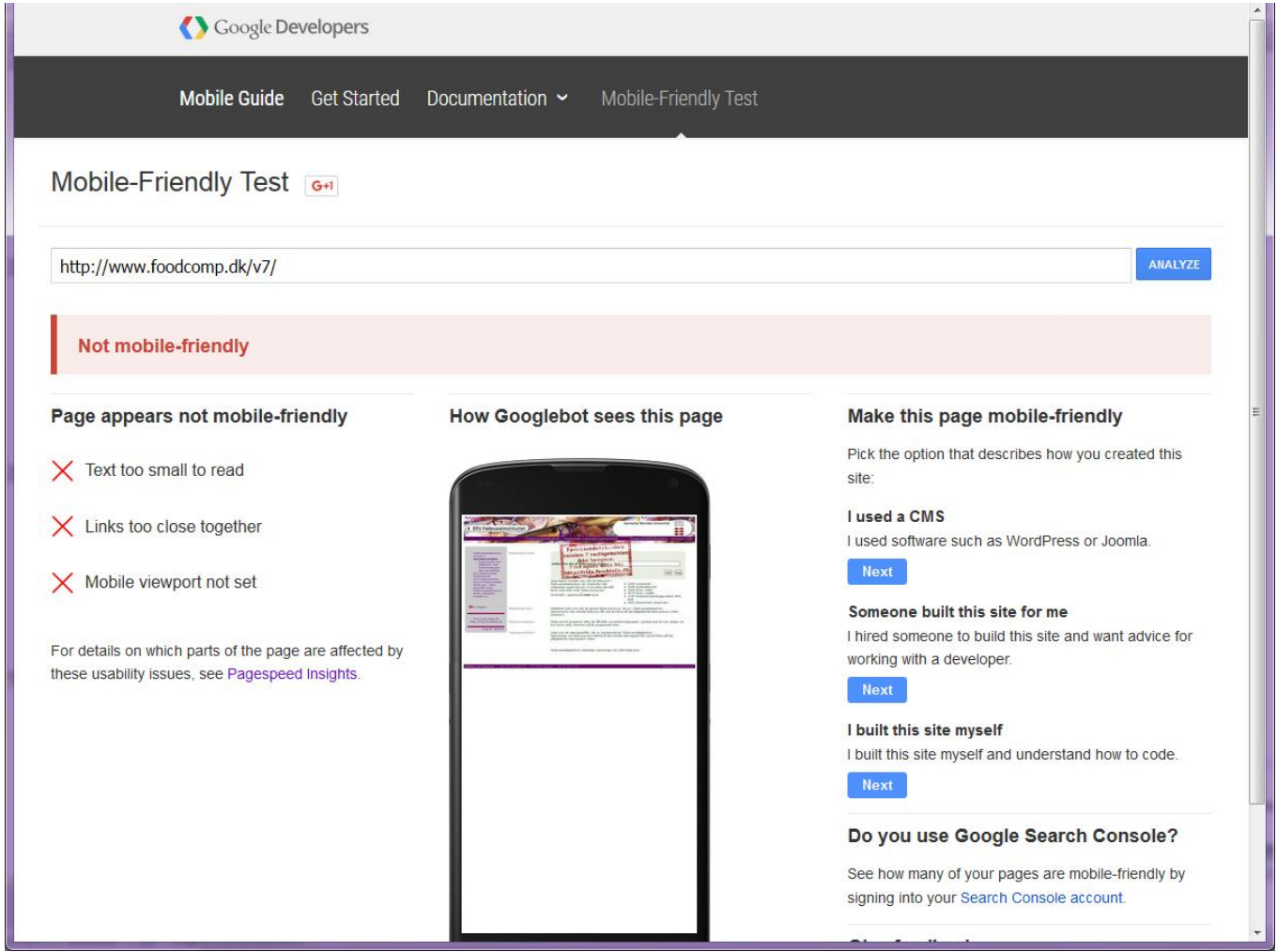
Cucumis sativus L.

Svind: 5%

Indhold pr. 100 g	Enhed	Indhold	Variation	Antal	Kilde
Energi	kJ	45			00050
Protein, total [NCF: 6.25]	g	0.7	0.5 - 0.9	26	S0003
total-N	g	0.115	0.085 - 0.150	26	S0004
Fedt, total [FACF: 0.800]	g	0.1		4	S0005
mættede fedtsyrer	g	0.033			00050
monoumætt. fedtsyrer	g	0.003			00050
polyumætt. fedtsyrer	g	0.044			00050
Kulhydrat, total	g	2.1	1.00 - 3.33	16	S0007
kulhydrat, tilgængelig	g	1.95			00050
tilsat sukker	g	0			00000
kostfibre	g	0.75	0.53 - 1.08	38	S0008
Alkohol	g	0			00000
Aske	g	0.4	0.3 - 0.55	26	S0009
Vand	g	96.4	95.11 - 97.860	38	S0010
A-vitamin	RE	5			00050
Retinol	µg	0			00802
ß-caroten	µg	62	23 - 92	4	05148
D-vitamin	µg	0			00802
D3 cholecalciferol	µg				
D2 ergocalciferol	µg				
25-hydroxycholecalciferol	µg				
E-vitamin	a-TE	0.15			00050
alfa-tokoferol	mg	0.15	0.10 - 0.22	7	00128
K-vitamin	µg	0	<5		00909
B1-vitamin, thiamin	mg	0.017	0.002 - 0.026	39	S0011
B2-vitamin, riboflavin	mg	0.017	0.012 - 0.027	27	S0012
Niacin	NE	0.28			00050
niacin	mg	0.2	0.12 - 0.21	10	00112
tryptofans bidrag	mg	0.08			00050
B6-vitamin	mg	0.034	0.015 - 0.051	38	S0013
Pantothensyre	mg	0.30			00802
Biotin	µg	0.40			00802
Folat	µg	18	9.9 - 26	27	S0014
B12-vitamin	µg	0			00802
C-vitamin	mg	13.7			00050
L-ascorbinsyre	mg	9.7	3.3 - 14.9	38	S0015
L-dehydroascorbins.	mg	4.0			05177
Natrium, Na	mg	10	4.7 - 20.0	6	00152
Kalium, K	mg	136	84 - 202	27	S0016
Calcium, Ca	mg	21	11 - 35	12	S0017
Magnesium, Mg	mg	9	6.22 - 13.0	27	S0018
Phosphor, P	mg	25	16.8 - 35.0	6	00109

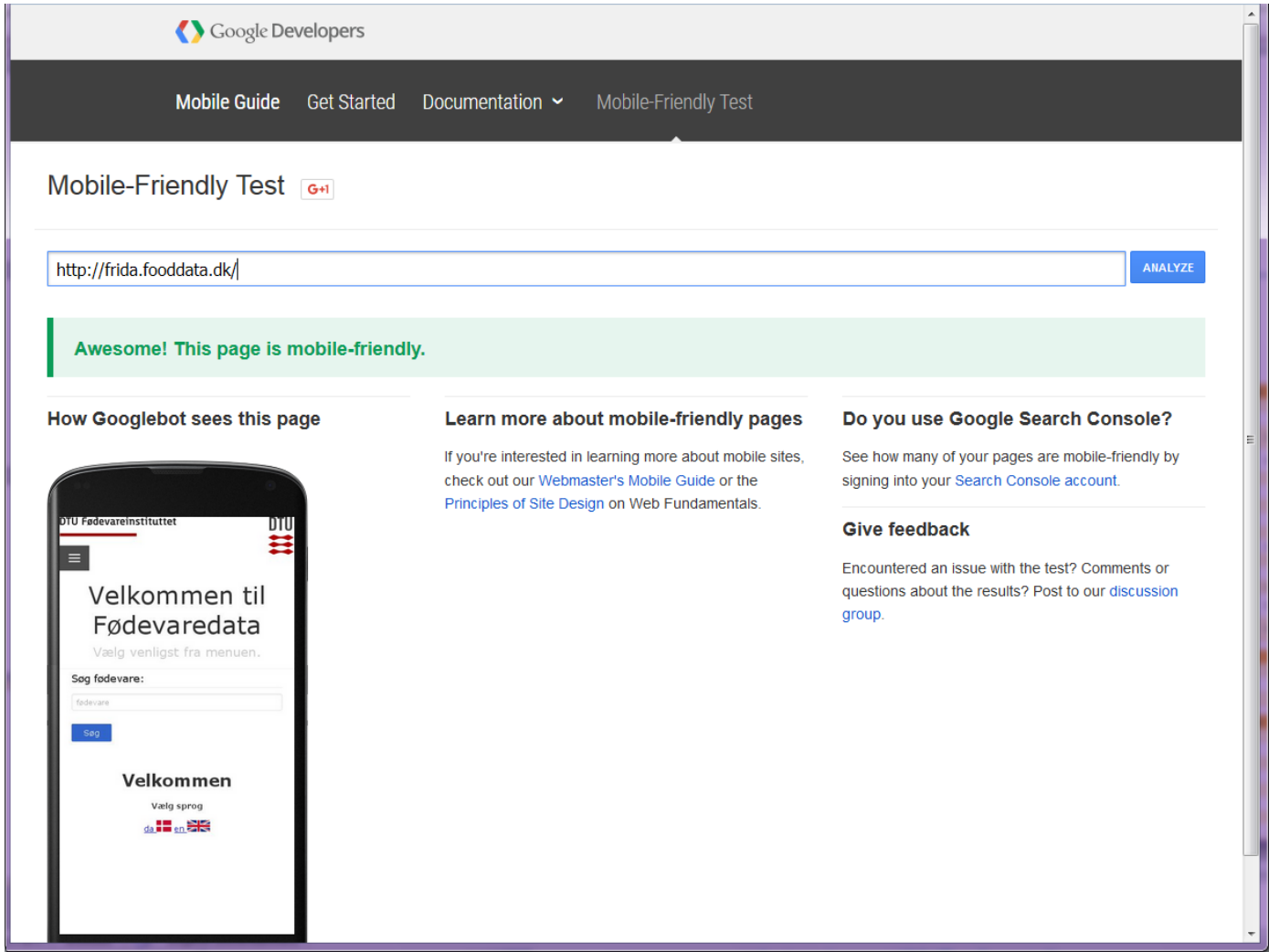
www.foodcomp.dk

- 2009 third release of foodcomp.dk



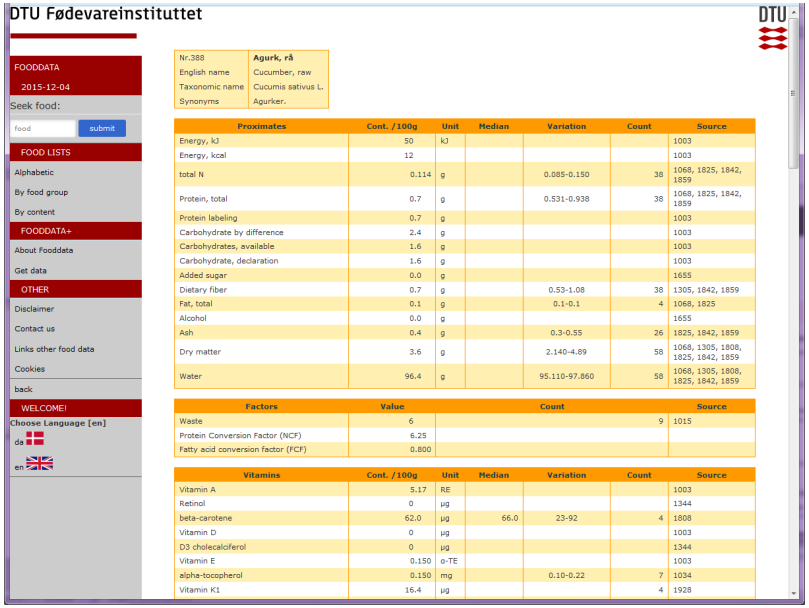
frida.fooddata.dk

- 2015
  - New layout
  - New data



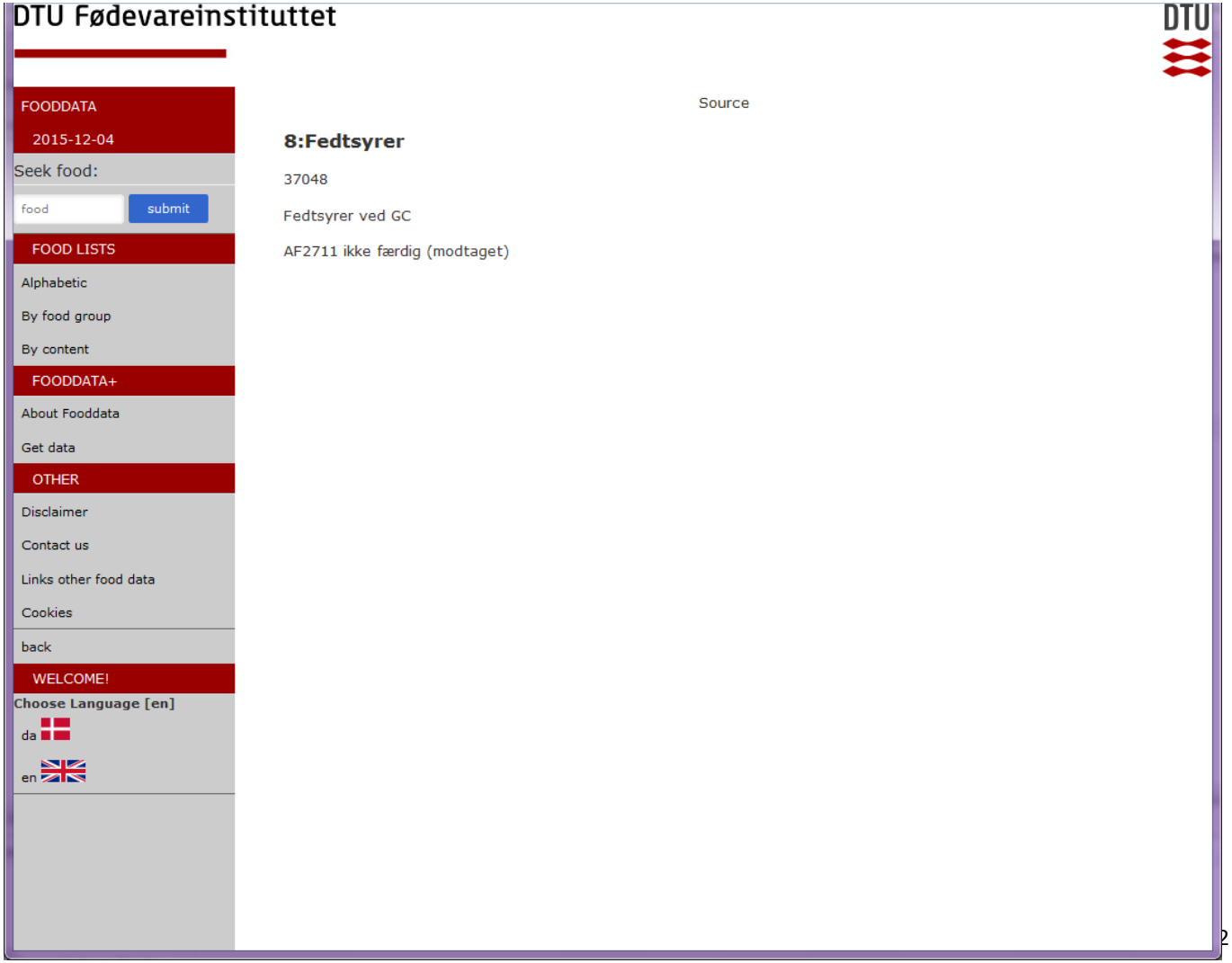
Frida.fooddata.dk

Main site
(food composition data)



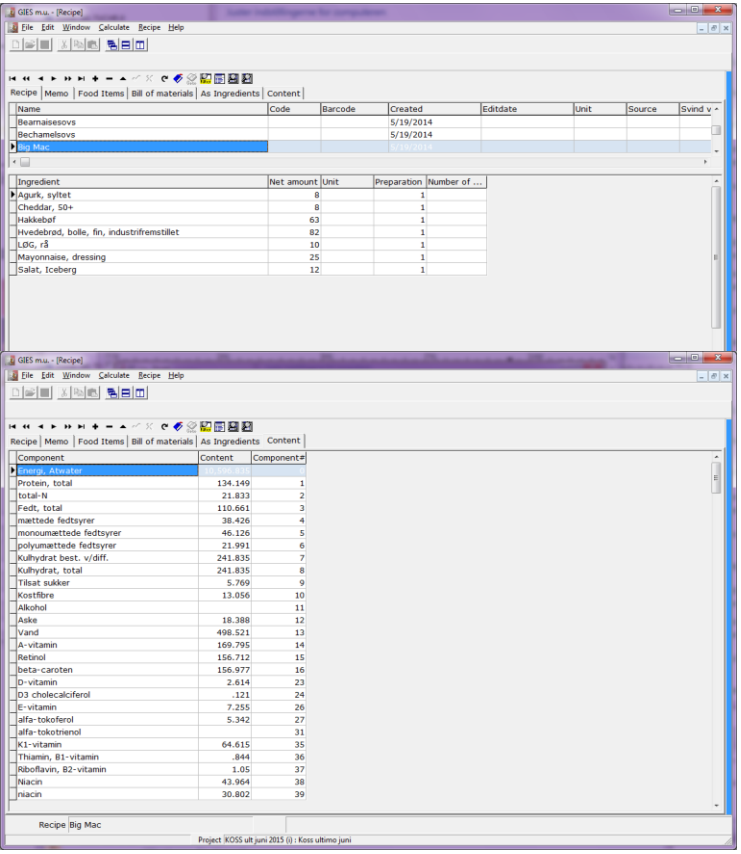
Sub site
(Documentation and membersite)

More transparency



Case study - recipe calculation compared to chemical analysis of fast foods.

Recipe calculation in GIES



Objective and rationale

- This study looks at the biases in nutrient estimation introduced by recipe calculation by comparing the content of selected nutrients estimated by recipe calculation and chemical analysis of fast foods (www.frida.fooddata.dk).

- Some fast foods are composite foods (often needs a recipe for calculation)

- Selected nutrients
  Energy – nutrients come with energy
  Protein – protein rich foods such as meat
  Saturated fat – critical fat (90% get above 10 E%)
  Iron – critical mineral (53% women 18-50 y below AR)
  Thiamin – B-vitamin (24% below Average Requirement)
  Potassium – fruit, vegetables and potatoes
  Sodium – critical mineral (most get to much)

Methods

- 135 samples of ready to eat fast foods as burgers, sandwiches, toasts, pitas, hot dogs and sausage mix (in total 7 types) collected from outlets (as sold over the counter) all over Denmark.

- They were separated into their recipe components as bread/buns, French fries, lettuce, meat, cheese, dressings etc. Each component were then weighed.

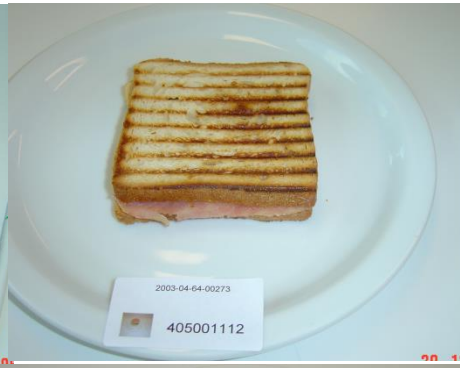
- The 135 items of fast foods were then chemical analyzed (as one food) for nutrient content.

- The content of nutrients were compared to recipe calculation performed using the weight, component description and photos taken of the fast foods.

- Wilcoxon Signed Rank test, Spearman correlation and Bland Altman plots were used to compare the recipe calculation of nutrient content to chemical analysis.

Examples of fast foods



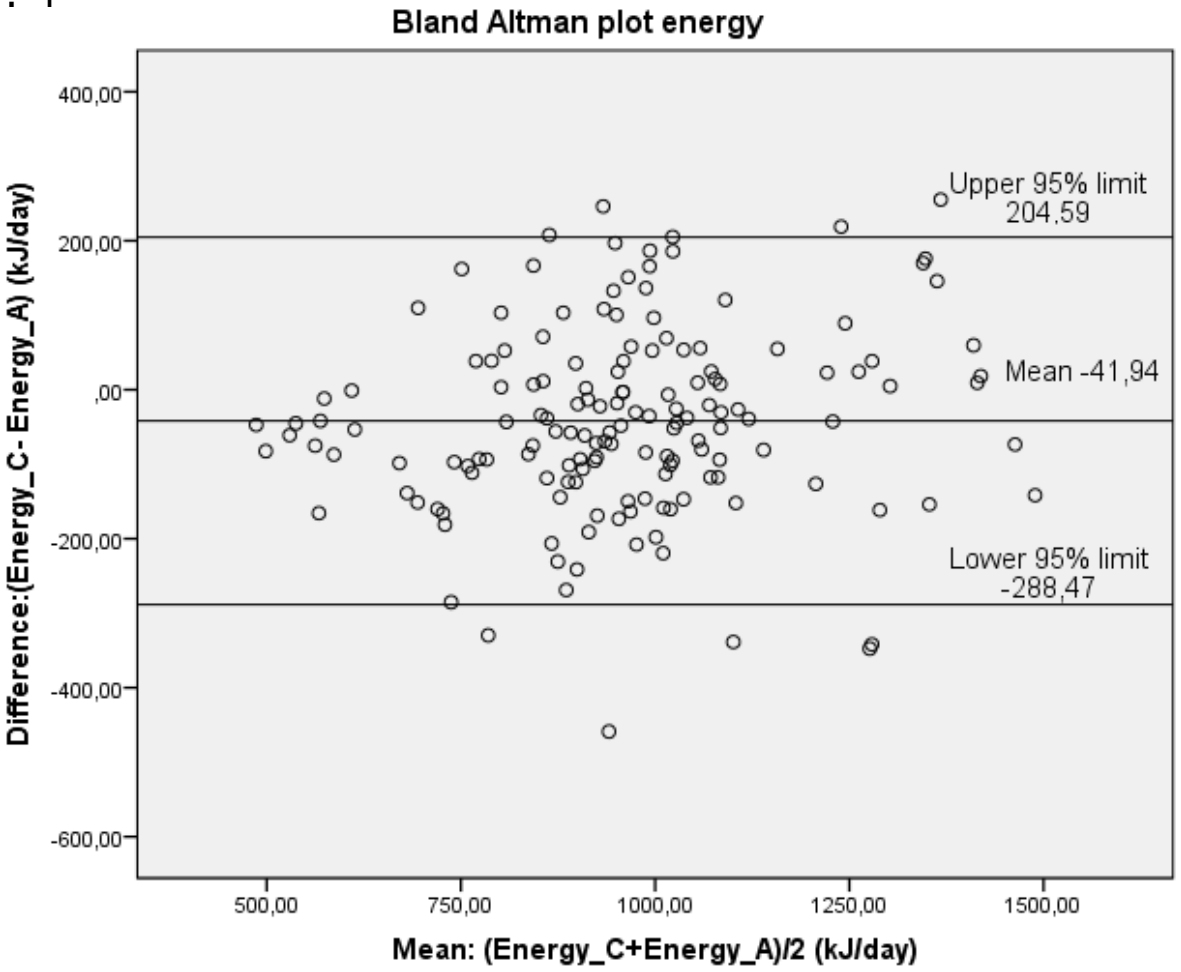




Results

	Difference	Difference (%)	P-value	Correlation
Energy (kJ/100g)	-42	-4	<0.01	0,75**
Protein (g/100g)	-1	-10	<0.01	0,68**
Saturated fat (g/100g)	1	28	<0.01	0,74**
Thiamin (mg/100g)	-0,01	-8	0.07	0,70**
Potassium (mg/100g)	3	1	0.87	0,71**
Iron (mg/100g)	0,1	9	<0.01	0,49**
Sodium (mg/100g)	-3	-0,6	0.21	0,66**

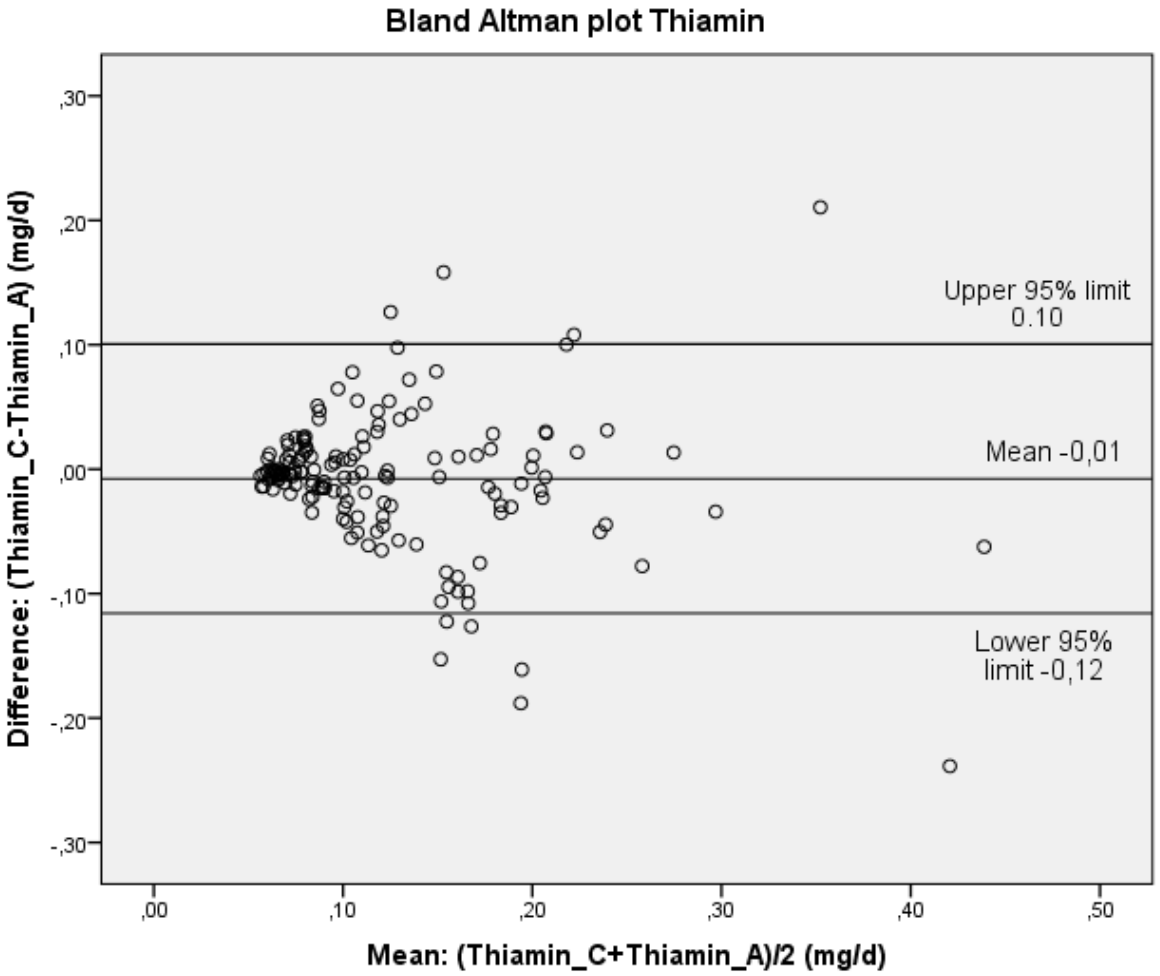
Results: Energy

- P: <0.001
- Correlation: 0.75
- Difference (%): 4



Results: Thiamin – proportional bias

- P: <0.07
- Correlation: 0.7
- Difference (%): 8



Results depended on type of fast food

- For burgers (n=36) there was no significant difference between any nutrients (more uniform product).

- For the rest there was a significant difference for 2-3 nutrients except for sausage mix which had significant and large differences (up to 45% for saturated fat) for 5 out of 7 nutrients except for energy and potassium.

Discussion and conclusion

- Weakness: Difficult to weigh the amount of dressing accurately. Do not have the actual recipe of ingredients. Have not analyzed individual components.
- Strengths: Get around the uncertainties of yield and retention factors by using components instead of recipe. The composite product is as the costumer buy and eat it.
- Fore some processed and manufactured foods, means are not representative of values for certain brands. In our case foods on the catering market may vary from foods bought in stores. Furthermore, foods, may have been reformulated, since last analysis (in this case frying oil).
- Important both for nutrient intake evaluation and for small companies in order to provide the nutrient information required on the label.
- Shows the importance of having up to date and representative nutrient values.
- Inclusion of more varieties and better coverage of foods used as ingredients/components in composite foods.